AMENDMENTS TO THE CLAIMS

Claim 1: (Currently Amended) An electron beam irradiation apparatus comprising:

a rotary driving unit for rotationally driving an object to be rotated;

a shield container for rotatably accommodating the object and an interior of said shield container is set in an atmosphere of an inert gas; and

an electron beam irradiation unit provided in said shield container so that the surface of the object is irradiated with electron beams from an irradiation window thereof,

wherein the surface of the object is irradiated with the electron beams during its rotation from said irradiation window of said electron beam irradiation unit,

wherein said shield container is provided with a gas introduction port and a gas discharge port from which the inert gas flows in the vicinity of said irradiation window,

wherein a temperature sensor is provided in the vicinity of said irradiation window, and

wherein a flow rate of the inert gas is adjusted based on a temperature measured by said temperature sensor.

Claim 2: (Original) An electron beam irradiation apparatus according to claim 1, wherein said electron beam irradiation unit emits the electron beams under a low acceleration voltage.

Claim 3: (Previously Presented) An electron beam irradiation apparatus according to claim 1, wherein the acceleration voltage of said electron beam irradiation unit is 20 kV through 100 kV.

Claim 4: (Canceled)

Claim 5: (Canceled)

Claim 6: (Previously Presented) An electron beam irradiation apparatus according to claim 1, wherein an oxygen concentration meter for measuring an oxygen concentration within said shield container is provided.

Claim 7: (Previously Presented) An electron beam irradiation apparatus according to claim 1, wherein a vacuumizing device for depressurizing the interior of said shield container is provided.

Claim 8: (Previously Presented) An electron beam irradiation apparatus according to claim 1, wherein the object has a disc shape, and

an area extending in at least one radial direction of the surface of the object is irradiated with the electron beams.

Claim 9: (Currently Amended) An electron beam irradiation apparatus ~~according to claim 1~~, comprising:

a rotary driving unit for rotationally driving an object to be rotated wherein the object has a disc shape~~,~~;

a shield container for rotatably accommodating the object; and

an electron beam irradiation unit provided in said shield container so that the surface of the object is irradiated with electron beams from an irradiation window thereof,

wherein the surface of the object is irradiated with the electron beams during its rotation from said irradiation window of said electron beam irradiation unit,

wherein said electron beam irradiation unit includes a plurality of electron beam irradiation tubes, and

wherein each of said electron beam irradiation tubes irradiates each of a plurality of areas on the surface with the electron beams.

Claim 10: (Currently Amended) An electron beam irradiation apparatus ~~according to claim 1~~, comprising:

a rotary driving unit for rotationally driving an object to be rotated;

a shield container for rotatably accommodating the object;

an electron beam irradiation unit provided in said shield container so that the surface of the object is irradiated with electron beams from an irradiation window thereof; and

~~wherein~~ a shutter member is disposed between said irradiation window and the surface of the object, ~~and~~

wherein the surface of the object is irradiated with the electron beams during its rotation from said irradiation window of said electron beam irradiation unit, and

wherein a shutter driving mechanism moves said shutter member between an opening position of permitting transmission of the electron beams emitted from said irradiation window and a closing position of blocking the electron beams, thus controlling switchover of the irradiation and non-irradiation of the electron beams upon the surface of the object.

Claim 11: (Original) An electron beam irradiation apparatus according to claim 10, wherein the switchover is conducted so that a quantity of emission of the electron beams is set large when said shutter member is in the opening position and set small when said shutter member is in the closing position.

Claim 12: (Currently Amended) An electron beam irradiation apparatus ~~according to claim 1~~, comprising:

a rotary driving unit for rotationally driving an object to be rotated;

a shield container for rotatably accommodating the object; and

an electron beam irradiation unit provided in said shield container so that the surface of the object is irradiated with electron beams from an irradiation window thereof,

wherein the surface of the object is irradiated with the electron beams during its rotation from said irradiation window of said electron beam irradiation unit, and

wherein said shield container is openable and closable and is composed of a metallic material, and has a shielding structure for shielding the electron beams emitted from said irradiation window.

Claim 13: (Currently Amended) An electron beam irradiation method comprising the steps of:

rotationally driving an object to be rotated accommodated in a shield container that can be

air-tightly closed; ~~and~~

irradiating the surface of said on-rotating object with the electron beams from an irradiation window of an electron beam irradiation unit;

depressurizing an interior of said shield container and thereafter replacing in the interior an inert gas atmosphere by introducing an inert gas;

flowing the inert gas through the vicinity of said irradiation window toward a gas discharge port from a gas introduction port, thereby cooling off the vicinity of said irradiation window; and

adjusting a flow rate of the inert gas based on a temperature measured by a temperature sensor provided in the vicinity of said irradiation window, thereby controlling a cooling temperature.

Claim 14: (Previously Presented) An electron beam irradiation method according to claim 13, wherein said electron beams irradiation unit emits the electron beams of which an acceleration voltage is 20 kV through 100 kV.

Claim 15: (Canceled)

Claim 16: (Currently Amended) An electron beam irradiation method according to claim [[15]] 13, further comprising the step of controlling a flow rate of the inert gas while measuring an oxygen concentration within said shield container.

Claim 17: (Canceled)

Claim 18: (Canceled)

Claim 19: (Previously Presented) An electron beam irradiation method according to claim 13, wherein the object has a disc shape, and further comprising the step of irradiating on the surface an area, extending in at least one radial direction, on the surface with the electron beams.

Claim 20: (Currently Amended) An electron beam irradiation method ~~according to claim 13~~, comprising the steps of:

rotationally driving an object to be rotated accommodated in a shield container that can be air-tightly closed;

irradiating the surface of said on-rotating object with the electron beams from an irradiation window of an electron beam irradiation unit; and

irradiating each of a plurality of areas with the electron beams with a plurality of electron beam irradiation tubes of said electron beam irradiation unit

wherein the object has the disc shape~~, and further comprising the step of irradiating each of a plurality of areas with the electron beams with a plurality of electron beam irradiation tubes of said electron beam irradiation unit~~.

Claim 21: (Currently Amended) An electron beam irradiation method ~~according to claim 13 further~~ comprising the ~~step~~ steps of:

rotationally driving an object to be rotated accommodated in a shield container that can be air-tightly closed;

radiating the surface of said on-rotating object with the electron beams from an irradiation window of an electron beam irradiation unit; and

moving a shutter member disposed between said irradiation window and the surface of the object between an opening position of permitting transmission of the electron beams emitted from said irradiation window and a closing position of blocking the electron beams, thus controlling switchover of the irradiation and non-irradiation of the electron beams upon the surface of the object.

Claim 22: (Original) An electron beam irradiation method according to claim 21, wherein the switchover is conducted so that a quantity of emission of the electron beams is set large when said shutter member is in the opening position and set small when said shutter member is in the closing position.

Claim 23: (Allowed) An electron beam irradiation apparatus comprising:

a rotary driving unit for rotationally driving an object to be rotated;

a shield container for rotatably accommodating the object;

an electron beam irradiation unit provided in said shield container so that the surface of the object is irradiated with electron beams from an irradiation window thereof;

a shutter member disposed between said irradiation window and the surface of the object and movable between an opening position of permitting transmission of the electron beams emitted from said irradiation window and a closing position of blocking the electron beams; and

a shutter driving mechanism for moving said shutter member so as to effect switchover to the irradiation and non-irradiation of the electron beams during a rotation of the object,

wherein the object has a disc shape, and an area, extending in a radial direction, on the surface is irradiated with the electron beams from said irradiation window.

Claim 24: (Allowed) An electron beam irradiation apparatus according to claim 23, wherein said electron beam irradiation unit includes a plurality of electron beam irradiation tubes disposed in the radial direction on the surface.

Claim 25: (Allowed) An electron beam irradiation apparatus according to claim 24, wherein said plurality of electron beam irradiation tubes are so arranged as to substantially uniformize a distribution of irradiation beam intensities of the electron beams in the radial direction.

Claim 26: (Allowed) An electron beam irradiation apparatus according to claim 25, wherein a period of electron beam irradiation time is controlled corresponding to a radial position of the object so as to substantially equalize an integrated irradiation dose of the electron beam irradiation in the radial direction.

Claim 27: (Allowed) An electron beam irradiation apparatus according to claim 25, wherein said shutter member is constructed to start, when opened, opening in an outer peripheral position and to gradually open toward an inner peripheral position on the surface of the object.

Claim 28: (Allowed) An electron beam irradiation apparatus according to claim 25, wherein an aperture is formed extending in the radial direction,

the switchover to the irradiation and the non-irradiation of the electron beams is performed by opening and closing said aperture through a movement of said shutter member, and

the electron beam irradiation time is controlled corresponding to the radial position of the object, depending on a relative position between said shutter member and said aperture and on a moving speed of said shutter member.

Claim 29: (Allowed) An electron beam irradiation apparatus according to claim 24, wherein said plurality of electron beam irradiation tubes are arranged to obtain such a distribution that an irradiation beam intensity of the electron beams is high on the outer peripheral side but low on the inner peripheral side in the radial direction.

Claim 30: (Allowed) An electron beam irradiation apparatus according to claim 29, wherein said shutter member is constructed to open and close at a comparatively higher speed than a rotating speed of the object.

Claim 31: (Allowed) An electron beam irradiation apparatus according to claim 30, wherein an aperture is formed extending in the radial direction, and

the switchover to the irradiation and the non-irradiation of the electron beams is performed by opening and closing said aperture through a movement of said shutter member.

Claim 32: (Allowed) An electron beam irradiation method comprising the steps of:

rotationally driving an object to be rotated accommodated in a shield container that can be air-tightly closed;

irradiating the surface of said on-rotating object with the electron beams from an irradiation window by moving a shutter member provided between the surface of the object and said irradiation window of an electron beam irradiation unit; and

stopping the irradiation of the electron beams by blocking the electron beams in a way that moves said shutter member after the irradiation of the electron beams for a predetermined period of time.

Claim 33: (Allowed) An electron beam irradiation method according to claim 32, wherein said electron beams irradiation unit has an acceleration voltage ranging from 20 kV to 100 kV.

Claim 34: (Allowed) An electron beam irradiation method according to claim 32, further comprising the steps of depressurizing an interior of said shield container and thereafter replacing in the interior an inert gas atmosphere by introducing an inert gas.

Claim 35: (Allowed) An electron beam irradiation method according to claim 34, further comprising the step of flowing the inert gas through the vicinity of said irradiation window toward a gas discharge port from a gas introduction port, thereby cooling off the vicinity of said irradiation window.

Claim 36: (Allowed) An electron beam irradiation method according to claim 32 , wherein the object has a disc shape, and further comprising the step of irradiating with the electron beams from said irradiation window an area, extending in a radial direction, on the surface.

Claim 37: (Allowed) An electron beam irradiation method according to claim 36, wherein the irradiation of the electron beams is effected by a plurality of electron beam irradiation tubes, serving as said electron beam irradiation unit, arranged in the radial direction of the surface.

Claim 38: (Allowed) An electron beam irradiation method according to claim 37, further comprising the steps of arranging said plurality of electron beam irradiation tubes to substantially uniformize a distribution of irradiation beam intensities of the electron beams in the radial direction, and controlling a period of electron beam irradiation time corresponding to a radial position of the object so as to substantially uniformize a distribution of an integrated irradiation dose of the

electron beam irradiation in the radial direction.

Claim 39: (Allowed) An electron beam irradiation method according to claim 38, wherein said shutter member starts opening in an outer peripheral position and gradually opens toward an inner peripheral position on the surface of the object, thereby controlling the electron beam irradiation time.

Claim 40: (Allowed) An electron beam irradiation method according to claim 37, further comprising the step of arranging said plurality of electron beam irradiation tubes to obtain such a distribution that an irradiation beam intensity of the electron beams is high on the outer peripheral side but low on the inner peripheral side in the radial direction.

Claim 41: (Allowed) An electron beam irradiation method according to claim 40, further comprising the steps of opening and closing said shutter member at a comparatively higher speed than a rotating speed of the object.

Claims 42-68: (Canceled)